"Beat the Heat" Neck Cooler Activity Kit

AN INTRODUCTION TO ANIMAL ADAPTATION

Visit www.nature-watch.com/neckcooler to watch step by step video assembly instructions.

How do some animals survive in very cold environments while other animals thrive in the heat? Why is it that some animals need a lot of water while others can live with almost no water?

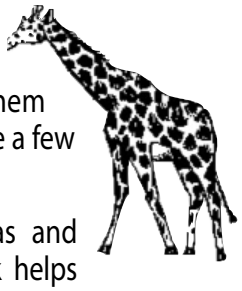
The answer is that over a long period of time, animals have adapted to the particular environments in which they live. These adaptations are the reasons that they can survive, and even thrive, in very difficult conditions. But exactly how and why do these adaptations occur?

An **adaptation** is a change in the habit and/or behavior of an animal species that enables it to better survive within its environment. Adaptations evolve and are maintained by means of natural selection. **Natural selection** is the process whereby organisms that are better adapted to their environment tend to survive and produce more offspring. Animals that have not adapted die out, and only the adapted ones survive and reproduce. Because babies are similar to their parents, the whole species soon contains only animals that are well adapted to their environment.

Adaptations develop over time. Over many generations, animals develop characteristics that help them thrive in their environment. These adaptations may help them get food and water, defend against predators, withstand weather or create offspring. There are two basic types of adaptations: physical and behavioral. A **physical adaptation** (also called a structural adaptation) is a feature of the body such as shape, size or body covering. A **behavioral adaptation** is how an animal acts in response to its environment.

To the Instructor: You will notice that this manual is written as if it were to be read by young learners. We have done this intentionally to provide specific language and examples that can be used in lessons taught by those unfamiliar with this topic. Feel free to use our language or simply pull out the facts and use your own.

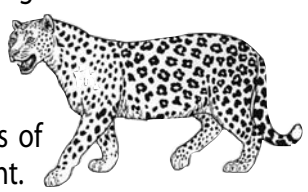
Examples of Animal Adaptation



Every animal has a unique set of adaptations designed to help them survive in their environment. Here are a few examples:

Giraffes are native to the savannas and grasslands of Africa. Their long neck helps them reach food that shorter animals are not able to reach. A giraffe's neck can be over 6 feet long! Giraffes also have a long, rough tongue to help them strip the leaves off of trees. Giraffes love to eat the leaves of acacia trees, which contain a lot of water. Bending down to drink water leaves them vulnerable to predators, so giraffes have adapted to obtain most of their water from the leaves that they eat. With their long legs, giraffes can run away quickly to escape predators. Over short distances, they can reach speeds of 35 miles per hour. In addition, the pattern on their coat helps camouflage them among grasses and trees.

Leopards can be found in the grasslands, woodlands and forests of Africa and Asia. Leopards have adapted over time to eat a broad diet which allows them to find food even when resources are scarce. They have also adapted to obtain most of the water they need from the food they eat (they don't need to drink in order to get the water that their body needs to survive). The spotted coat of a leopard provides camouflage when they are stalking their prey. They are strong predators, able to run at speeds of up to 36 miles per hour. Leopards are also agile climbers and can drag their kills up a tree to protect them from scavengers. Leopards are usually nocturnal, meaning they rest during the hottest parts of the day and are more active at night.



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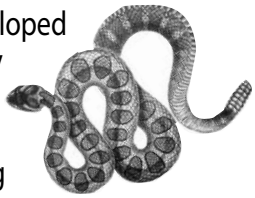
Rev. 2014/09 M159

Zebras are African animals that can be found in grasslands, woodlands and plains. The most notable feature of zebras is their striped coats; each zebra has their own unique pattern! The most common explanation for the purpose of these stripes is camouflage. Zebras can blend in with tall grasses, allowing them to hide from predators. Zebras are social animals, commonly found living in family groups. On occasion, these groups will join together to form a larger herd. In larger herds, the group helps protect individual animals from encroaching predators. Also, their stripes make it more difficult for a predator to distinguish an individual zebra from a running herd. Zebras have great stamina to help them outrun predators. They are also nomadic, meaning they can travel far distances in order to find food and water.

Rattlesnakes can be found in the deserts, prairies and forests of North and South America. Rattlesnakes belong to the pit viper family, meaning they have a heat sensing pit on either side of their head. This organ allows them to detect changes in temperature and helps them hunt warm-blooded animals. Rattlesnakes have developed venomous fangs that quickly inject venom to kill their prey. Once they have captured their prey, they use their flexible jaw mechanism to swallow large animals whole. To keep themselves safe from predators, rattlesnakes have learned to use their rattles as a unique warning system. Also, their patterned skin helps camouflage them in their surroundings. Rattlesnakes are cold-blooded, meaning they have to use external means to regulate their body temperature. They will "bask" in the sun to heat up, or hide in the shade of a rock to keep cool.

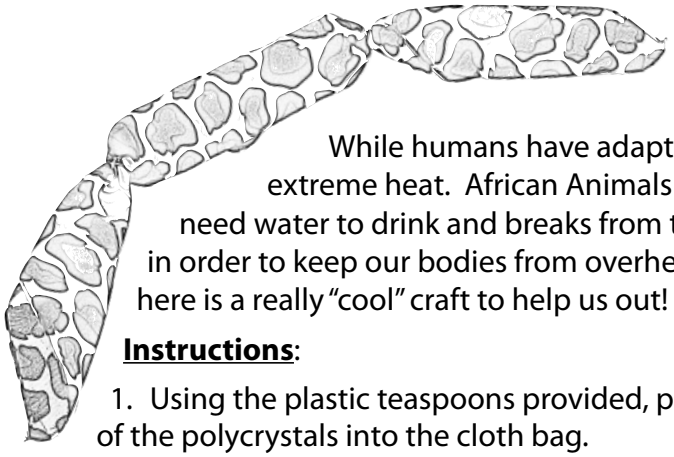


Polar Bears are found in the Arctic Circle and can withstand some of the coldest temperatures on Earth. They have a thick layer of blubber and fur that helps keep them warm. Their fur is not actually white – it is translucent! Each hair reflects visible light, making it appear white. This helps them blend into their surroundings. Their large paws act like snowshoes, helping them spread out their weight and keep their balance on slippery ice. Polar bears are powerful swimmers and are able to travel great distances in search of food.

Dolphins are found in shallow seas of the continental shelves. They have a streamlined body which helps them move quickly through the water. They use their strong tail fin to help propel them while swimming, and their other fins to help them steer. Many dolphins have acute eyesight, but they commonly use echolocation to help guide them underwater. Dolphins emit a series of clicks and use the echoes to locate objects around them. They are warm-blooded mammals with a thick layer of blubber which helps them maintain their body temperature. Dolphins use their blowhole to breath, and they can close their blowhole while diving, allowing them to go several minutes without air. They are also social creatures, mainly found in groups that work together to hunt for food and raise offspring.

Barn owls can be found in many areas, including America, Africa and Asia. Barn owls are nocturnal, meaning they are most active at night. They can be identified by their unique heart-shaped facial disc, formed by stiff feathers, which helps amplify sounds when hunting. They also have excellent hearing and vision, which helps them locate and identify prey even in darkness. While other birds have stiff feathers that make a sound when they fly, owls have soft feathers on their wings, so they can fly silently. This allows them to sneak up on their prey. Barn owls have powerful feet and sharp talons capable of snaring prey and carrying it away.

HOW TO MAKE YOUR "NECK COOLER"



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While humans have adapted in many ways, we are not very well suited to living in extreme heat. African Animals have adapted to heat and lack of water, but we consistently need water to drink and breaks from the heat to cool down in order to keep our bodies from overheating. Fortunately, here is a really "cool" craft to help us out!

Materials

- Bandanas
- Cloth bags with drawstring
- Polycrystals
- Plastic Spoon

Instructions:

1. Using the plastic teaspoons provided, place ONE teaspoonful of the polycrystals into the cloth bag.
2. Pull the drawstring on the cloth bag as tight as possible. Then, tie the strings in a knot.
3. After tying the knot in the drawstring, use a scissors to carefully cut the 2 excess strings (each string will be about 6"-7" long.) SAVE THESE STRINGS! You will use them in step 6!
4. Take a bandana and inspect it to see which of the 2 printed sides is the "dull" back side and which is the more "vibrant" colored front side. (The tag is on the back/dull side.) Lay the bandana on a table with the dull side up. Turn it so that it looks like a diamond shape with points at the top, bottom and sides.
5. Take the cloth bag and lay it on the corner of the bandana closest to you. Pick up the corner of the bandana and begin to roll the bag into the bandana (kind of like a Tootsie Roll, but diagonally) until the entire bandana has been rolled up (you may want to stop just short of that in order to leave a little "tail" at the end).
6. Remember the excess strings from step 3? Here's where we need them! Using your hands, figure out where each side of the bag of polycrystals ends within the bandana. Use one string on each side to tie the bandana right next to the end of the bag. Repeat on the other side. These two knots will hold the bag in place (if needed, see photo included with the kit for a picture of where to tie these strings.)
7. At any point that you are ready to use the neck cooler, submerge the entire bandana in cool water for about 10 minutes. The polycrystals inside will absorb the cool water and will keep you cool while wearing. Simply tie it around your neck and enjoy the "coolest" craft ever! It will also serve as a cool reminder of the ways some animals have adapted to "beat the heat."
8. Once completely dry, it might look like the polycrystals are gone! But don't worry…simply soak the neck cooler in cool water each time you want to wear it and the crystals will absorb water over and over again!

Did you know???

- Arabian camels can store up to 80 pounds of fat in their humps. They can break down this fat into water and use it to travel long distances in dry conditions.
- African elephants use their large ears to cool themselves on hot days. By flapping their ears, the blood circulates in the ear's numerous veins; the blood returns to the head and body about 9 F cooler.
- Emperor penguins live in Antarctica, where wind chills can reach -76 F! Penguins huddle together for heat, and take turns rotating to the perimeter of the group so each penguin has a chance to be in the warm center of the group.
- Giant squid have the largest eyes in the animal kingdom, measuring approximately 10 inches in diameter. These large eyes help them see in dark conditions in the depths of the ocean.

Worksheet Answers

1.	Adaptation	A.	P	E.	P
2.	Natural Selection	B.	P	F.	P
3.	Physical	C.	B	G.	P
4.	Behavioral	D.	P	H.	B
5.	E - All of the above	E.	B	I.	P

Name: _____

Reinforcing what you've learned about animal adaptation.

Answers on pg. 3

Now that you've learned some key facts about animal adaptaion, put your knowledge to the test!

1. An _____ is a physical feature or behavior that helps an animal survive.
2. Animals that are better adapted to their environment are more likely to survive and produce offspring. This process is called _____ _____.
3. A feature of the body that helps an animal survive is a _____ adaptation.
4. How an animal acts in response to its environment is called a _____ adaptation.
5. Adaptations help animals survive in their environment. Adaptations help animals....
   a. Get food and water
   b. Defend against predators
   c. Withstand weather
   d. Create offspring
   e. All of the Above

Adaptations...are they Physical or Behavioral? Circle B or P for each of the following:

A. Giraffe's long neck	B P	E. Zebra stripes	B P
B. Echolocation by dolphins	B P	F. Barn Owl's heart shaped facial disk	B P
C. Zebras travel in herds	B P	G. Rattlesnake's venomous fangs	B P
D. Polar bear's thick blubber	B P	H. Rattlesnake rattling tail to warn others	B P
E. Leopard's nighttime activity	B P	I. Leopard's spotted coat	B P

Draw a picture of one of your favorite animals and list 3 adaptations that help them survive.

(Indicate whether the adpatations are Behavioral or Physical.)

Adaptations

Circle One

1. _____ B P
2. _____ B P
3. _____ B P

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